

THE INVENTION CLAIMED IS:

1. A device for detecting the presence of pathogens trapped in an electric field, comprising

5 a fluidic channel through which pathogen flow,  
at least one pair of interdigitated electrodes positioned in a surface of the fluidic channel,

an AC power source for applying a voltage across electrode plates of said at least one pair interdigitated electrodes for producing an electric  
10 field to enable trapping of pathogens passing through the fluidic channel, and  
means for measuring the impedance between the electrode plates for determining the presence of trapped pathogens

2. The device of Claim 1, additionally including a plurality of spaced interdigitated electrodes located along a length of the fluidic channel.

15 3. The device of Claim 2, wherein each of said interdigitated electrodes is provided with a means for measuring the impedance thereof.

4. The device of Claim 2, wherein said means for measuring the impedance is operatively connected to each of the electrode plates of the spaced interdigitated electrodes.

20 5. The device of Claim 1, wherein said electrode plates has at least one leg located in spaced relation to at least one leg of the other of the pair of plates.

6. The device of Claim 5, wherein each of said electrode plates includes a pair of space leg sections each of said leg section of one of the electrode plates being located adjacent to a leg section of another of said electrode plates.

25 7. The device of Claim 1, wherein said means for measuring the impedance, comprises: a plurality of signal generators, a current sensor, a plurality of amplifiers, and a plurality of mixers to measure in-phase and out-of-phase components of impedance between the electrode plates.

8. In a device for trapping particles in an electric field formed by electrodes the improvement comprising: means for detecting the presence of trapped particles,

5                   said means including the detection of impedance changes between the electrodes.

9. The improvement of Claim 8, wherein said means comprises a sensor for measuring impedance change between the electrodes.

10                  10. The improvement of Claim 9, wherein said electrodes comprise plates of interdigitated electrodes and wherein said sensor is operatively connected to said plates.

15                  11. The improvement of Claim 9, wherein said sensor comprises:  
A pair of signal generators, a current sensor connected to one of said electrodes, a pair of parallel connected amplifier/mixer assemblies operatively connected to said current sensor, said pair of signal generators being operatively connected to a mixer of said amplifier/mixer assemblies, with one of said pair of signal generators being also operatively connected to another electrode.

20                  12. A method for detecting the presence of pathogens trapped in an electric field, comprising:

                    providing at least one fluid channel through which the pathogens pass,  
                    providing at least one pair of interdigitated electrodes on a surface of the fluid channel,

                    providing an AC voltage across the interdigitated electrodes for producing an electric field for trapping pathogens,

25                  measuring the impedance between the electrodes and ,  
                    determining change in the impedance measurements.

13. The method of Claim 12, additionally including determining from the change in the impedance if sufficient pathogens have been trapped to further analyze the pathogens.

14. The method of Claim 12, additionally including providing a plurality of spaced interdigitated electrodes along a length of the fluid channel, and measuring the impedance of each of the interdigitated electrodes.

5 15. The method of Claim 12, wherein measuring the impedance between the electrodes is carried out using an impedance sensor operatively connected to said electrodes.

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